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Hello S&T Instructors - It's the start of another academic year with new challenges and opportunities, including a record number of incoming students. In this issue we feature some innovative and award-winning instructors, including Joel Burken, Theresa Swift and Greg Story. Also find information about the upcoming Curators' Teaching Summit and learn about projects that have been funded where S&T instructors will be examining and assessing best teaching practices.



CERTI
NEWSLETTER
Center for Educational
Research and Teaching
Innovation at **Missouri S&T**

Joel Burken On the “Easy Life”



Aimee Whitmire photo

What happens when you discover your passion, link it up with your unique skill set, and find a place that wants what you have to offer?

“Life is pretty easy,” says Joel Burken, professor of environmental engineering at Missouri S&T, who has enjoyed that trifecta in his own life and is eager to help others do the same.

The ease Burken refers to could never mean inertia as he has enjoyed a productive career in teaching, research and service for the past 18 years. He recently received the 2015 University of Missouri System President’s Award for Service, recognizing his exceptional contributions in advancing the mission of the University and its campuses. He has received no less than seven S&T Faculty Excellence Awards, as well as the Alumni Merit Award from Missouri S&T’s Miner Alumni Association in 2012. Burken

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Give Us Your Suggestions

Is there an instructor you would like to see featured in the CERTI newsletter? What about a teaching technique that you have found to be helpful? Email your ideas to **Diane Hagni** for consideration for future newsletter issues.

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serves as director of the Environmental Research Center and helped establish a full bachelor's degree program in his department as well as two minors, one in sustainability and one in global studies at Missouri S&T.

Other areas on campus where Burken has made significant contributions include establishing the Green Campus Committee as well as the Chester and Evelyn Baker Greenhouse, a unique research and education facility.

Almost by accident

For Burken, finding his passion happened almost by accident. The summer that he was entering graduate school at the University of Iowa, a faculty member asked him to help with a summer institute for gifted high school students. For three weeks, he was the academic leader of the group, teaching classes, doing experimental demonstrations, taking them on field trips and simply being there for them.

"I loved doing it!" he says. "I realized teaching and interacting with the students really sparked my interest and pulled all of my attention toward the students." When the camper feedback was returned, Burken had one of the highest evaluations in the program – second only to talent night.

"It was that lightbulb moment," he remembers. "I'd say both scientifically and socially, the idea of being able to work on research but then to be surrounded by people who want to learn from and with you and appreciated your efforts so much ... Some people find it draining to be

around students, but it really energizes me."

Burken continued with his Ph.D. at the University of Iowa, and then interviewed as a faculty member at Rolla the same week that he defended his dissertation. "It was a good fit," he says of S&T. "I am from a small town in Iowa originally. To have a balanced focus on the undergraduates and the research work we do here, this is a great balance for me and an excellent place for my family."

The feelings surely must be mutual as Missouri S&T has benefited from a scholar and teacher who envisions the future and addresses emerging needs with passion and excellence.

When Burken began at S&T, there was no environmental engineering program, but when employers and former students from civil engineering began talking about a growing demand for this type of specialization, he and others in the department jumped at the chance to develop the program. It was only one of a couple dozen in the nation in the early 2000's. (Now there are 73.) S&T's program has proven to be successful and growing, with about 70 students in the program, roughly half of these women.



Sam O'Keefe photo

Provost Robert Marley presents the 2015 UM System President's Award for Service to Joel Burken last spring.

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New Teaching Partners Program

Teaching Partners, a new service on campus for instructors who want to enhance their teaching, is available starting in fall 2015.

Teaching Partners is an optional, confidential professional development service for instructors who would like to receive feedback on their teaching from award-winning faculty and staff instructional designers.

Interested instructors fill out a request to participate in the **program** and CERTI and Educational Technology staff, who administrate the program, then connect instructors with the appropriate mentors.

A pre-observative meeting is held to discuss various aspects of the course and the instructor's needs/experiences. An observation time is scheduled, and then helpful feedback is offered in a post-observation meeting.

What happens with the results is entirely up to the instructor who was observed. He or she may wish to have something written up for a dossier, or may use the information as a benchmark to make changes for the future and ask to be observed again.

Scott Miller, teaching professor of materials science and engineering, was part of the pilot program last year and is excited about the potential of Teaching Partners. "In each of the classroom observations and discussions I have participated in through this program, I have learned innovative classroom techniques and delivery methods that I have then included in my own courses. It truly is a collaborative exercise and benefits everyone involved."

An informational forum on the program will be held September 21 at noon in Missouri/Ozark Room.

(Burken continued from p. 2)

As a “utility player” in the department, Burken teaches the environmental engineering fundamentals course for sophomores and has taught 10 other different courses, four of which are new courses he has developed here at S&T.

“I think I am fortunate that I have some good communication skills and interactive skills,” says Burken about his teaching. “When I go into the classroom, I make a great effort to break things down.” He also looks for a way to make things relevant for students, especially those new to the field.

Hitting home

One of his strategies is to find out at the beginning of the course what town his students are from, why they want to be at S&T and what they hope to get from the class. Later on in the semester, he brings up that information, referring to a location he knows a student is from, such as Advance, Mo. A surprised student will say, “I’m from Advance!” Burken will reply, “I know. I looked it up.” He then proceeds to ask that student whether she knew that her wastewater went into a local stream before going into the Mississippi River, and that another student in the class, whose hometown is downstream from her, drinks from that same water?

The discussion always gets a laugh, but it also grabs students’ interest because of the personal connection. “That’s the nice thing about the environmental side of things,” Burken says. “You can really hit home.”

Burken makes it a point to help students gain skills that will make them successful over the long term in their careers. “What will students today be faced with 40 years from now?” he says. “If we look back 40 years, it’s kind of unimaginable where we are now. We didn’t have

computers then.”

To that end, he tries to instill the underlying science and vocabulary, the 10 or so fundamental concepts that students should never forget from his classes. But, on the technical side of things, “I don’t kid them and tell them, ‘This is what you’re going to need for your career,’” he says. Instead, he tries to get them ready to be lifelong learners so they can apply the science in continually evolving ways.

“How can I make 10, 20, 30 people more successful in their position or career? The science discovery is great, but helping other people, our students, fellow faculty and staff do better,” he says, “that is what I look for in my career.”

His department has been proactive in thinking through what additional skills their graduates should have prior to leaving S&T. Even before the campus strategic initiative mandate, the civil, architectural and environmental engineering department required experiential learning where students were required to execute learning objectives while doing internships or co-ops, or working on Engineers Without Borders projects.

As much as he is invested in students, Burken also takes time to mentor junior faculty, something that he enjoys doing as associate chair of CARE.

“I look for opportunities to advance whichever group I’m working with,” Burken says. “I want to help others find their passion.

“How can I make 10, 20, 30 people more successful in their position or career? The science

discovery is great, but helping other people, our students, fellow faculty and staff do better,” he says, “that is what I look for in my career.”

Welcome to New Missouri S&T Faculty

Missouri S&T welcomes the following faculty to campus:

Vadym Mochalin, chemistry; Nicholas Ali Libre and Hongyan Ma, both of civil, architectural and environmental engineering; Jie Huang, electrical and computer engineering; Elizabeth Roberson, Rachel Schneider and Jossalyn Larson, all of English and technical communication;

Zeyi Sun and Sheryl Hodges, both of engineering management and systems engineering; Evgeniy Torgashov, Peyman Heidari, Katherine Grote, Lizhu Wang, all of geosciences and geological and petroleum engineering;

Jen-Hsien Hsu, Materials Research Center; Aditya Kumar, materials science and engineering; Henry Bailey, mathematics and statistics; Jillian Schmidt, Charles Wojnar, Warner Meeks and Lianyi Chen, all of mechanical and aerospace engineering;

Catherine Johnson and Joseph Graham, both of mining and nuclear engineering; Daniel Fischer and Alex Chernatynskiy, both of physics; and Jessica Cundiff, psychological science.

Welcome!

The Race to Blend Courses Goes to the Swift

If you would have asked Theresa Swift what “blended” had to do with college teaching four years ago, she might have guessed the type of coffee in an instructor’s latte.

So when her department chair Kelvin Erickson suggested at her annual review in 2011 that she consider blending one of her courses, she was not only skeptical, she had to look it up.

A staunch traditional lecturer, the associate teaching professor in electrical and computer engineering would have been happy with a chalk and blackboard (“I don’t even like white boards,” she says) until the day she retired.

It’s more than a little surprising, then, to note that Swift has completely blended the Circuits II course in her department, is in the process of blending Circuits I for fall 2015, and is enjoying teaching more than ever. Not only that, “my course evaluations just keep going up” compared to when she taught traditionally, she says.

A blended course involves taking a portion of student “seat time” in traditional lecture and providing ways for students to learn that information on their own time, usually through instructor-prepared videos. The remaining class time involves active learning, utilizing what students learned outside of class.

Swift wanted the out-of-class videos to serve in the same way a textbook is supposed to – for students to prepare for upcoming lectures by previewing the material. Only she knew that students weren’t doing that and were coming to class unprepared, expecting her to give them everything they needed to know. She could continue to provide that information with non-stop



Sam O’Keefe photo

lectures each week, but this did not leave much time for problem-solving in class, and it showed as students struggled with the homework. “It’s always easy when I do it on the board,” she said. “It’s not so easy when you sit down by yourself and try to do it.”

Swift typically teaches three sections of about 35-40 students in Circuits II. It is a required class for electrical engineering or computer engineering majors. Her blended strategy was to replace one 50-minute lecture period a week with theoretical material and derivations in video format that could be viewed multiple times. Students watch the videos and then take weekly quizzes to test their understanding of the material.

When the class meets face to face, there is much more time for problem-solving, and the students -- not Swift -- do most of the talking. “I come in and put the problem on the board and say, ‘What should I do with this problem? What is one possible way of approaching it?’ and I ask them to lead me through

it,” she says.

In addition, Swift incorporates group problem-solving about once a week, using old test or challenging homework problems that have more than one way to approach a solution. These aren’t graded exercises, however, students do get bonus points to replace a quiz score or add to their homework grade. It isn’t worth much point-wise, but students appreciate the hands-on practice.

She remembers a time in class that three students in a group spent time explaining a concept to a fourth student, who was struggling to understand. After that, she noticed that the struggling student seemed to be getting more A’s, which was a win-win for everyone. “It does work!” she says.

Initially, Swift was worried about students coming to class if she began putting material online, but she says she has had good attendance and is enjoying the quality of faculty-student interaction. “I didn’t think I would like it, but, I enjoy teaching more this way,” she says. “Students talk to me about how to solve the

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problems.

“Once you get it set up and developed, it’s actually easier to teach this way,” she says. “You just come up with new problems and new examples to do in class instead of giving the same dry lecture every semester.”

Students continue to be assessed the same way as in her previous traditional courses, with 3, one-hour exams and a common final. In the past three years that the blended course has been taught, she has seen no significant difference in final grades from the traditional course, although one semester the blended course grades were slightly higher. However, she believes that students are learning other skills that aren’t so easily assessed, such as how to judge the most efficient way to solve a problem when there are multiple options, as well as developing an appreciation for learning outside of the traditional classroom. She hopes these skills will translate to other classes as well as to future careers.

“Once you get it set up and developed, it’s actually easier to teach this way (in the blended format.)”

The blended class has been offered long enough now that Swift can begin to get feedback from graduating seniors who have been through the course. She included some questions on her department’s senior survey recently, and received feedback that was positive overall. One recent student in her 8 a.m. class told Swift as she was handing out group problems, “This is my morning O.J. This is my wake-up for the day!”

Swift accomplished the initial

redesign of Circuits II through an eFellow grant from the S&T provost’s office, which gave her a course release, and is appreciative of ongoing design and technical support from instructional designer Barbara Wilkins, of educational technology.

B.J. Shrestha, associate teaching professor, will be taking over the Circuits II course in the fall and will continue the blended format, using Swift’s online materials. Currently, Swift, Shrestha and Theresa Odun-Ayo, assistant teaching professor in the Missouri State University cooperative program, are working on an eFellow grant to redesign Circuits I, which will be piloted this fall.

For more information about the eFellows program, contact the [educational technology office](#).

Recognizing Excellence in Distance Education

Congratulations to 12 Missouri S&T faculty who were recognized by the office of global learning for their excellence in teaching in distance education courses last spring.

The Global Learning 2015 Outstanding Teaching Excellence Award recipients are:

- **Neil Anderson**, professor of geosciences and geological and petroleum engineering;
- **Victor Birman**, professor of mechanical and aerospace engineering and director of the Missouri S&T Engineering Education Center;
- **Andrew Blair**, a former lecturer in mining and nuclear engineering;
- **Deandra Cassone**, adjunct associate professor of

engineering management and systems engineering;

- **Lokeswarappa Dharani**, Curators’ Professor of mechanical and aerospace engineering;
- **Li Li Eng**, associate professor of business and information technology;
- **David Rogers**, the Karl F. Hasselmann Missouri Chair in Geological Engineering and professor in geosciences and geological and petroleum engineering;

The Global Learning 2015 Outstanding Teaching Commendation Award recipients are:

- **Mae Chen Ge**, associate professor of mining engineering;
- **Roger LaBoube**, Curators’ Teaching Professor emeritus and current adjunct professor of civil, architectural and environmental engineering;
- **Fiona Nah**, professor of business and information technology;
- **Lesley Sneed**, associate professor of civil, architectural and environmental engineering.

Faculty Calendar Available for Fall 2015

The fall 2015 [faculty professional development calendar](#) is now available on the CERTI website.

The calendar includes events from a variety of offices on campus, including Educational Technology, Undergraduate Advising, Office of Sponsored Programs, New Faculty Programs, Wilson Library, and the Center for Educational Research and Teaching Innovation.

2015 eFellows Grant Awards

Missouri S&T's Office of the Provost has announced the 2015-2016 eFellows grant awards. The funding initiative, now in its fifth year, is provided to help instructors blend a course, redesign a course to be fully online, or incorporate more online learning in a traditional course.

Grants are either \$5,000 Tier 1 grants or \$2,000 Tier 2 grants, depending upon the extent of the redesign. This cycle's \$5,000 grant awardees and the courses that will be redesigned are:

- **Amardeep Kaur**, assistant teaching professor of electrical and computer engineering, EE 2800: Electrical Circuits for non-EE majors
- **Christi Luks**, associate teaching professor, chemical engineering, ChemEng 2011 Material and Energy Balances
- **Dan Reardon**, assistant professor, English and technical communication, English 2243 and English 2244
- **Irina Ivliyeva**, associate professor, arts, languages and philosophy, Russian 3000/5001
- **Jossalyn Larson**, assistant teaching professor, English and technical communication, English 1160

This cycle's \$2,000 grant awardees and the courses that will be redesigned are:

- **Stephanie Fitch**, associate teaching professor, and **Sarah Sexton**, lecturer, mathematics and statistics, Math 1120
- **Elizabeth Cudney**, associate professor, engineering management and systems engineering, Engineering Management 5710/6710

Additionally, the Provost's Office provided a stipend for instructors to attend a Building Blocks workshop, which is a prerequisite for receiving a Tier 1 or 2 grant. For more information about the program, contact Angie Hammons, hammonsa@mst.edu.

Seven Projects Funded as Part of Mini-Grant Program

Seven educational research projects developed by Missouri S&T faculty have been funded for 2015-2016 as part of a mini-grant program co-sponsored by the office of Undergraduate Studies and the office of Educational Technology and administered through the Center for Educational Research and Teaching Innovation (CERTI).

This is the fifth year of the program; this year's awards totaled \$23,630. The program is designed to help instructors tackle a teaching and learning issue in which a specific, measurable research question is examined to bring about improved student learning, retention or academic success.

The 2015-2016 funded projects are:

"Visualizing Research and Writing: Improving Student Self-Confidence Through Focus Groups and Library Interaction," Jossalyn Larson, lecturer, English and technical communication, \$2,500;

"Introducing and Evaluating Innovative Teaching Techniques in Economics Principles Classes," Ana-Maria Ichim, assistant professor, and Sarah Steelman, assistant teaching professor, economics, \$5,500;

"Evaluating the Impact of Interactive Technology in the Classroom on Student's Perceptions," Elizabeth Cudney, associate

professor, engineering management and systems engineering, \$1,980;

"Do Flipped Lectures Increase Student Engagement With Course Material?" Katie Shannon, associate teaching professor, biological sciences, \$3,500;

"Evaluation of Section Properties App for Mechanics of Materials," Nicholas Ali Libre, assistant professor, civil, architectural and environmental engineering, \$3,500;

"Analysis of Student Success in a Blended Laboratory Course by Trend Analysis in a Parallel Lecture Course," Klaus Woelk, associate professor, chemistry, \$4,050;

"Assessment of Freshman Mathematics Placement at Missouri S&T," Stephanie Fitch, associate teaching professor, mathematics and statistics, \$2,600.

Results of this research will be shared with the campus at the Missouri S&T Teaching and Learning Technology Conference in March 2016.

For more information, go to <http://certi.mst.edu/educationalresearch/>.

Learning Students' Names

Is learning students' names a challenge for you? Here is an idea, provided by Paul Corrigan, assistant professor of English at Southeastern University, who found learning student names very frustrating until he came up with this strategy.

Have students get in groups of up to 25. One student volunteer for each group goes around the group and takes a video of each person saying their name into the camera. Students then send the video to the instructor, where it can also be posted on the course LMS, if desired, thus helping not only the instructor but other students in the class learn each other's names.



Lisa Story photo

Physics Education Plus Much More in Greg's Story

On the day Greg Story finished his high school career in Reedsport, Ore., he swore he would never see the inside of a school again.

The irony of that vow is not lost on the associate physics professor, who has spent the majority of his working days inside Missouri S&T's physics building for the last two decades.

"In physics, you are always learning something new," he says. "That can't be boring."

Academia was the furthest thing from Story's mind back then, even though he was a National Merit Scholar for whom higher education should have been an obvious choice. Instead, he found work in logging, oil fields and factories, among other jobs, and then toured

across the United States on a year-long bicycle trip when he was 19.

His abhorrence for high school was due to boredom not a dislike for learning in general, but after a couple of years of wandering from job to job, he discovered that he was still bored. It was time to re-evaluate and find a career that he could maintain a passion for. He remembered only one high school class that had been able to keep his interest. "In physics, you are always learning something new," he says. "That can't be boring."

So it was off to the University of Oregon, where he sailed through an undergraduate degree, and then pursued a Ph.D. in physics at the University of Southern California. After two post-doc positions, he arrived in Rolla without any teaching experience, but with a desire to engage students in learning about topics that had captured his imagination.

"I basically jumped right in," he

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Fall Curators' Teaching Summit To Be Presented

The annual Curators' Teaching Summit will once again be held this fall featuring the campus' Curators' Teaching Professors.

The first session will be geared toward tenure-track assistant professors and what they need to be successful in teaching for promotion and tenure. "Tenure Expectations for Teaching: What Assistant Professors Need to Know" will be held from noon-1:30 p.m. Wednesday, Sept. 9, in St. Pat's Ballroom A. Lunch is provided. In addition to the Curators' Teaching Professors, the panel discussion will include faculty who have served on campus promotion and tenure committees.

The second session will be on the topic of student feedback and is open to all instructors. "Using Student Feedback to Enhance Teaching" will be held from noon-1:30 p.m. Wednesday, Oct. 14, in St. Pat's Ballroom A. Lunch is provided. Hear how award-winning instructors use student feedback to increase student learning and improve course evaluations.

The third of the three-part series will be geared toward non-tenure track faculty. "Teaching Topics for Non-Tenure Track Faculty" will be held from noon-1:30 p.m., Monday, Nov. 9, in the Missouri/Ozark Room. Lunch is provided.

Please reserve a spot for any of the events by contacting Diane Hagni at hagnid@mst.edu.

(Greg Story continued from p. 7) says about teaching his first classes. But things did not turn out well initially. After getting his dismal end-of-course evaluations for a Laser Physics course, he took his teaching notes and dropped them in the trash.

He credits physics professors Jerry Peacher and Paul Parris as his unwitting mentors in the early days; his desire to be a better teacher compelled him to stand outside their classroom doors and glean from their experience.

Since then, Story has worked at continuously improving his teaching. And he has been successful, garnering 17 campus teaching accolades, including 12 consecutive Outstanding Teaching Awards. Last year, he had the top teaching ratings based on end-of-course evaluations at Missouri S&T.

"My ultimate talent is that I can explain things to people," Story says. "But none of that works unless you can engage students."

Engagement and passion go together, according to Story. He has been able to "infect" his students with the passion he has for physics, and inspire them in their own learning. The number one comment students make about him in the course evaluations is: "He clearly loves what he does."

R-E-S-P-E-C-T

Story remembers reading a study where a psychology professor, normally very passionate about his subject, decided to see what would happen when he taught a semester in a deadpan mode, not showing interest in the material that he was teaching. Predictably, his teaching evaluations went down, but students rated everything else lower in the class as well, including the textbook!

Story feels strongly about the importance of respect for all students, regardless of their

academic ability, another of his secrets for success. He rejects the elitist attitude where the top 'A' students are the only ones deemed important, and the rest are unfortunate casualties in the classroom.

"My philosophy is that every student that comes in here, I want to give them the best education that they can get," he says. "There are the absolute best students, but then there are students that aren't as bright. But the idea of saying that you're not as important because you're not an 'A' student is horrible. You work harder with them."

"My ultimate talent is that I can explain things to people," Story says. "But none of that works unless you can engage students."

One of Story's regrets is that he has not been able to help every student succeed, despite his best efforts and his belief that every student can succeed. But that doesn't stop him from continually reaching out semester after semester. "I do office hours constantly," he says. "I tell students that if I'm not teaching another course, you can come in and see me."

Always learning and sharing

Story teaches Modern Physics, Quantum Mechanics, and Laser Physics, as well as the capstone course for physics majors. He may begin teaching the now defunct Astronomy course in an upcoming semester. In all, he has taught 11 different physics classes during his tenure at S&T, from freshman to graduate level. His classes range from less than 20 to up to 80 students, with many students

coming from outside of the physics department.

Teaching and learning are primary passions of Story's, but not the only ones. He started writing poetry while in high school, and learned to play the guitar at age 14. He now can play eight different instruments and performs his music regularly in the Rolla community. He has written five books of poetry, six novels and five plays, three of which have been performed locally.

One of his newfound passions is to give public lectures for general audiences, taking his knowledge about physics and sharing it with interested lay people. He has given a dozen lectures within the last few years and would like to do more.

"For me it's a joyful thing – to try to take a complicated idea and make it simple for people who have no background in the field," he says. "I really love that."

CERTI'S Mission Statement

CERTI provides a variety of faculty resources for teaching and learning, such as professional development events, educational research assistance, observation and feedback of classroom teaching, and serves as a clearinghouse for other teaching information and resources on campus.

The Center is housed under the Vice Provost for Undergraduate Studies Office

To find out more information or check out additional resources, go to certi.mst.edu or contact Diane Hagni at hagnid@mst.edu.